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## PROJECT 1 ABSTRACT

(1 Page Limit)

Serious scab (Fusarium head blight) epidemics occurred in Kansas in 1982, 1990, 1993, 1995, 2008, 2009, 2015 and 2019 with annual losses averaging $6.5 million. Approximately one million acres of wheat in eastern Kansas are annually at risk from scab where rainfall is higher during heading and corn residue is more prevalent, providing high inoculum pressure and suitable environmental conditions for scab development. Since 1980, wheat acreage in the eastern quarter of Kansas has declined by two thirds. A major cause of the decline has been aversion to the risk of scab epidemics. Therefore, the availability of cultivars with resistance to scab is a high priority for eastern Kansas. Additionally, there are three important trends suggesting that scab has the potential to become more prevalent in central Kansas, where wheat is the traditional dominant crop (about 4 million additional wheat acres). First, there is a trend for increasing corn cultivation in central Kansas, a major reservoir of scab inoculum. Second, producers/farmers are trending toward no-till production strategies, which enhances spore production and release from the residue. Third, many preferred varieties in central Kansas are susceptible to scab. Resistant wheat cultivars adapted to this area of Kansas would be highly desirable. Genetic resistance offers the highest probability of success for economic management of this disease. The long-term goal of this research is to develop hard red and hard white winter wheat cultivars adapted for Kansas with improved resistance to scab. Short term objectives are to: 1) test existing local cultivars for reaction to scab, 2) test advanced breeding lines for reaction to scab, 3) test exotic germplasm lines for reaction to scab, 4) test the Hard Winter Wheat (Kansas, Montana, Oklahoma, Texas, Nebraska, South Dakota, North Dakota) Scab Nursery for reaction to scab, and 5) incorporate newly identified sources of scab resistance into the Kansas wheat breeding program. Testing will be performed in misted field nurseries using soil-applied infested corn grain inoculum and in the greenhouse using single-floret inoculations. Visual disease evaluation methods will be used to rate the percentage spikelets infected by the pathogen and ground grain samples will be analyzed for the toxin DON. Data will be disseminated to wheat producers and used by wheat breeders as they make selections for future Kansas cultivars.